Orthodontic considerations for gingival health during pregnancy: a review

Abstract: Gingivitis is caused by several known systemic and local factors. Among systemic factors, the role of hormonal changes during pregnancy is well established. While presence of fixed orthodontic appliances alone may not cause gingivitis, factors such as pregnancy and poor oral hygiene combined together could precipitate acute gingival inflammation that may progress to a periodontal condition in a patient receiving orthodontic therapy. There has been an increase in the number of adult patients who are receiving orthodontic treatment. Orthodontic appliances could act as a potential plaque retentive source and aggravate inflammatory reactions that are seen during pregnancy. There is a lack of awareness regarding oral healthcare issues among patients who are pregnant and choose to seek orthodontic treatment. In addition, there is a need in the literature to outline management guidelines for patients who want to receive orthodontic treatment during pregnancy, with or without pre-existing gingival conditions. This review focuses on the aetiology of pregnancy gingivitis and the management of orthodontic patients during pregnancy. Our emphasis is on patient education, oral hygiene maintenance, preventive and treatment strategies for the management of gingival health in orthodontic patients during pregnancy. We also highlight some of the possible complications of initiating orthodontic treatment during pregnancy.

Key words: gingiva; oral hygiene; orthodontics; pregnancy

Gingivitis

Gingivitis is one of the most common causes of periodontal disease. Aetiological factors of gingivitis can be broadly classified into local and systemic causes. Local causes may include
Vascular and hormonal changes may increase the gingival crevicular fluid and aggravate response to plaque (8, 11).

Oral health care during pregnancy

It has been reported that in the United States, over 6 million women get pregnant each year (22). Less than a quarter of these women receive any dental care during pregnancy (23, 24). Studies have also reported that an important factor that determines if pregnant women seek dental care is their socio-economic status and subsequently the type of oral hygiene methods used (25). Women with lower socio-economic strata tend to avoid visiting dental offices during pregnancy. In addition, there is a lack of awareness among women about the potential risk of poor pregnancy outcomes and periodontal disease (24, 26, 27). Thus dental care visits are reduced during pregnancy and some choose to wait until after delivery to address any oral healthcare needs (28). Studies have shown a correlation between periodontal disease and increased risk of preterm low birth weight babies. In addition, there is research to support that treatment of periodontal disease could reduce preterm births (29–33). There have been reports that support the association of periodontal disease with pre-eclampsia during pregnancy (34).

It is therefore not surprising that several studies have been conducted to investigate dental care seeking behaviour during pregnancy. Most of them show that at the most only 35–50% of women visit the dentist during pregnancy (23, 35). Another interesting area to discuss at this point is the behavioural aspects of pregnant patients. There appears to be a tendency towards self-negligence and maintenance of poor oral hygiene habits during pregnancy (36). For many years, education campaigns have followed the Knowledge-Attitude-Behaviour (K-A-B) Model. The K-A-B model asserts that education leads to greater awareness and attitude change and this leads to responsible behaviour. Behaviour is also affected by social contexts and social norms that may contribute towards changing behaviour, as well as personal motivations, religious and cultural beliefs, and knowledge about the consequences of actions (6, 37). Thus, being cognizant of these important issues is critical for the dental profession who could play a major role in patient education and oral health awareness.

Periodontal health during orthodontic treatment

Some professionals believe that long-term periodontal health benefits from orthodontic care, while others believe that it...
does not (38–40). Orthodontic therapy can provide benefits to adult periodontal health in several cases such that crowding where improvement in the alignment allows better access to oral hygiene maintenance. In addition, opening embrasures in some cases could help regain lost papilla and obvious aesthetic improvement caused by adjusting gingival margin especially in the anterior region (41). However, especially during pregnancy, in cases that have pre-existing gingival inflammation, presence of orthodontic appliances could increase the demand of rigorous oral hygiene maintenance and in patients who lack that self-motivation, the periodontal condition may get aggravated when orthodontic appliances are present in the oral cavity. It is known that fixed appliances can act as plaque-retaining devices. However, when coupled with pre-existing gingival inflammation that may be present in a pregnant patient, there could be fast progression towards periodontal disease. Ideally, tooth movement should not be done during active gingival inflammation because of increased risk of periodontal abscess formation. According to some reports, the prevalence of periodontal disease in pregnancy is around 35–100% (22). There is also an additional factor of self-neglect among pregnant women as we have discussed earlier (36). Also postpartum, women’s oral health condition has been shown to deteriorate further. While there is literature to support that oral health of women is not optimal during pregnancy and after childbirth, there have been three case–control cohort and cross-sectional studies that have demonstrated that periodontal disease may be a potential independent risk factor for preterm low-birth-weight babies (29, 30, 42). Thus, it is of paramount importance to create awareness in the dental profession and also to educate women about the importance of oral health care during orthodontic therapy especially if they are pregnant.

Orthodontic considerations and management

Medical, dental and psycho-social history

Like any other form of dental care, before starting orthodontic therapy, a thorough and detailed medical history is critical. However, in case of pregnancy, it is important to get the opinion of the gynaecologist if any known complications are to be expected. A history of current medications is also valuable because various drugs have oral side effects and may influence the course of the orthodontic therapy. Drugs such as bisphosphonates and vitamin D metabolites could probably cause a reduction in tooth movement during orthodontic therapy, while non-steroidal anti-inflammatory drugs have also been shown to reduce bone resorption. Any previous medical conditions such as diabetes mellitus or previous pregnancy complications are important to know in advance before starting orthodontic treatment (14, 33). The patient’s perception of their own health is considered to be an important aspect of their psychosocial make up and potential compliance. If the patient has suffered previously from certain complications during her pregnancy and is at a risk as per her medical care provider, it may be best to wait until postpartum to start orthodontic therapy.

A complete dental history provides the orthodontist knowledge about the patient’s attitude towards dental care and patient’s priorities. A patient who does not receive routine dental care and is negligent about oral care is unlikely to be compliant during orthodontic treatment. A record for the cause of tooth loss if any is also important. History of trauma and sensitivity with previously traumatized teeth is extremely important to know prior to commencement of orthodontic treatment. As the number of adult patients seeking orthodontic treatment is on an increase, it is important that the orthodontists must be more active and capable of diagnosing gingival and periodontal problems. If the patient already has signs such as gingival inflammation, bleeding on probing, presence of pockets and poor oral hygiene, it may be wise to start orthodontic therapy after the pregnancy. However, there are no obvious contraindications to orthodontic therapy in a healthy pregnant patient. However, it may be advisable to limit the visits to shorter appointments to avoid the patient being in extreme supine position especially during the later stages of the pregnancy. Radiographic imaging such as a panoramic film and periapical films are routinely used to assess periodontal health and root inclinations. According to American Dental Association (ADA), every precaution should be taken to minimize radiation during pregnancy. However, if there is an acute dental infection, it must be addressed and radiographs can be taken. In addition, the radiation caused by oral radiography is minimal. It is advisable to coordinate the orthodontic treatment plan with the obstetric care provider to establish guidelines that will benefit maternal oral health and perinatal outcomes.

It is important for the orthodontist to know if the patient is self-motivated and enthusiastic about receiving orthodontic treatment. It is especially important to take into account the hormonal and physiological changes that will be anticipated during the course of pregnancy and the patient must be mentally prepared to visit the orthodontist for regular adjustments. It is critical to discuss in depth about the entire course of the treatment, the expected number of visits and the level of cooperation that will be required for successful completion of orthodontic treatment to achieve ideal function and aesthetics.
Orthodontic treatment plan

It is of utmost importance to plan a simple and realistic treatment plan in patients who are pregnant. A good communication between the orthodontist and the patient is a key for successful results. If the patient wants to undergo orthodontic therapy primarily for frontal aesthetics and is not willing to be compliant for a 2-year treatment plan and comprehensive therapy, this needs to be established at the beginning. In such patients, limited treatment should only be performed. As an alternative in some patients, it may be advisable to wait until after the pregnancy to start orthodontic treatment.

Oral hygiene maintenance during orthodontic treatment

Before starting orthodontic treatment, any pre-existing periodontal condition must be addressed. Because of pre-existing hormonal changes during pregnancy, the gingival tissues may be already inflamed in pregnancy women. Thus, a more rigorous oral hygiene routine will be required to maintain optimal oral health. Frequent dental prophylaxis will be helpful and meticulous home-care regimens will need to be employed to ensure success. In addition to tooth brushing, a detailed instruction in the manipulation of dental floss will enable the patient to floss when the braces are in the mouth. Many interdental cleaning aids such as tooth picks or miniature bottle brushes can be attached to handles for the convenience of manipulation around teeth (8). Thus oral hygiene regimen maintained at home and coupled with professional dental cleaning will ensure successful oral health and keep orthodontic patients during pregnancy free of gingival and periodontal disease during active treatment.

Patient education and awareness

To increase the use of dental care services among pregnant women, it will be beneficial for dental care professionals to work in conjunction with prenatal healthcare professionals and other dental specialties. It is important that medical professionals dealing with prenatal care be educated the importance of dental care to their patients. In addition, the dental healthcare providers must be aware of the importance of dental care during pregnancy and effects of poor periodontal health on pregnancy and the baby. It is also important for social care services to identify and eliminate barriers such as low educational and socio-economic status that may interfere and prevent pregnant women from obtaining dental care. Various behavioural modification techniques could be employed. The K-A-B model has been shown to be successful to motivate patients in improving their oral hygiene. Knowledge about this technique will enable the clinicians to provide the necessary information to their patients to improve their level of understanding of their oral health issues. Thus, constant motivation of the patient could help improve patient compliance during orthodontic treatment. It is critical for the dental care provider to focus on changing the individual’s perceived need towards oral health and/or values associated. Especially during orthodontic treatment, which is over a period of a couple of years, constant reinforcement and periodic monitoring and occasional discussions with the patient are extremely crucial. Most importantly, there needs to be a psychological change and motivation in the patient that will make them conscious about their oral hygiene status. It is important to emphasize that professional tooth cleaning alone is not sufficient for preventing gingival and periodontal issues and conscientious oral home care is also of paramount importance. Thus, a combination of professional tooth cleaning and educational reinforcement of oral hygiene will prove to be successful. The model in Fig. 1 depicts steps for successful orthodontic treatment during pregnancy and also highlights causes of failure.

Patient summary (A)

Figure 2(a) are the initial intra-oral pictures of an 18-year-old patient presented to the Orthodontic Resident Clinics at the University of Connecticut Health Centre with a chief complaint ‘I do not like my teeth’. Patient was diagnosed with a class I malocclusion with 0% overbite and 4 mm overjet. Patient had retained primary maxillary canines, buccally erupting maxillary left canine and a transposed maxillary right canine. During the initial consultation, it was noted that the patient was 6 weeks pregnant. Apart from the pregnancy, there was no other significant medical history. Her oral hygiene status was fair. The patient was advised to obtain physician’s
approval prior to the start of her orthodontic therapy. Some of the major concerns during her orthodontic treatment were gingival inflammation and bleeding exacerbated with poor oral hygiene. Figure 2(b and c) demonstrate the gingival inflammation around brackets in 3 and 6 months after initiating orthodontic treatment. Although the orthodontic treatment in this case was not difficult, the management of this case became more complex because of inflammatory reaction seen during pregnancy and lack of patient compliance to maintain good oral hygiene.

Patient summary (B)

Figure 3(a) are the initial intra-oral pictures of a 19-year-old patient with the chief complaint ‘I do not like the gap in the front’. Patient was diagnosed with class II malocclusion with anterior open bite caused by thumb sucking habit. She was 3 months pregnant at the start of treatment. Lower right first molar was extracted 2 years ago because of caries. Lower left first molar was endodontically treated and had a periapical lesion. It was scheduled for extraction by her general dentist. Patient’s thumb sucking habit was addressed with positive reinforcement and orthodontically, she was to be treated with upper bicuspid extraction and using an extrusion arch, we planned to close the open bite. Patient wanted to get implants in the future to replace her mandibular first molars. Figure 3(b and c) illustrate progress pictures 3 and 6 months later. There was improvement with the open bite and patient’s oral hygiene was well maintained.

Conclusions

Professional knowledge

From literature review and case report, it has been found that orthodontic treatment during pregnancy may aggravate...
gingivitis caused by local and systemic factors. Periodontitis during pregnancy may lead to complications during pregnancy and preterm low-birth-weight babies. Awareness among oral and prenatal healthcare professionals is critical for optimal patient care.

Role of professionals

For successful completion of orthodontic treatment, a good communication must be established between the patient and the orthodontist from the beginning. Detailed history, oral examination and assessment of patient compliance and expectations will enable the orthodontist to develop practical goals for successful treatment. It is important for orthodontists to be aware of the limitations that may be inherent in such cases. In addition to reinforcing oral hygiene, it is important that the patient be sent for professional cleaning at regular intervals. Good communication among healthcare professionals will benefit the patient and improve their quality of life.

Role of patients

It is important for women to be aware of the importance of oral health care especially during pregnancy. We have therefore described in detail the known associations between periodontal disease and complications during pregnancy. Simple and effective home-care measures described earlier and professional dental care will enable women to prevent any gingival and/or periodontal issues during the course of their orthodontic treatment.

References